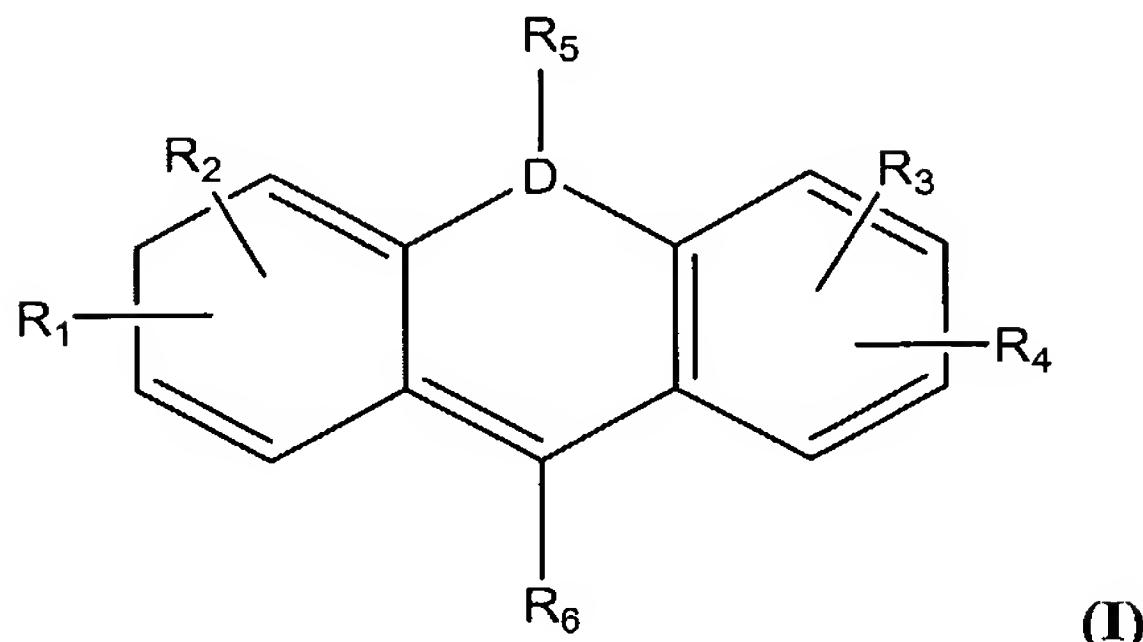


## CLAIMS

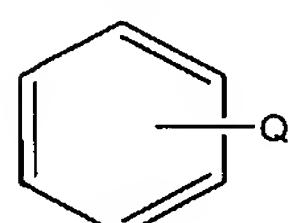
*What is claimed is:*

1. A small molecule metabolite reporter compound of the following formula:



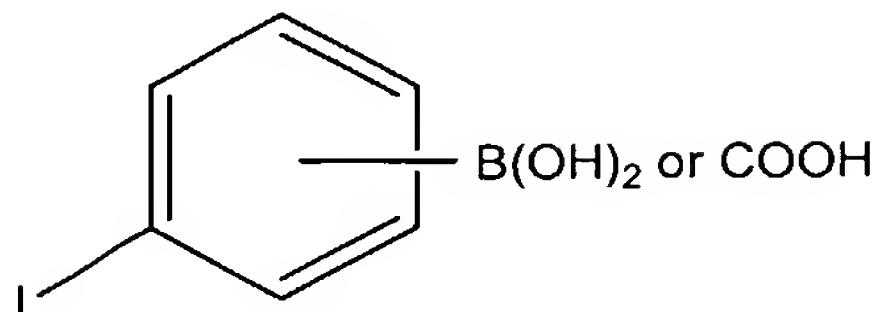
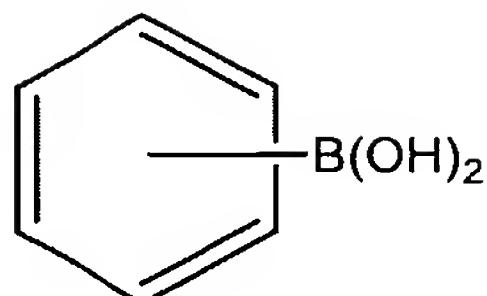
5 wherein

- D is a heteroatom;
- R<sub>1</sub> and R<sub>2</sub> are different and are selected from the group consisting of H, OH, NH<sub>2</sub>, NO<sub>2</sub>, OCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub>, A, or, R<sub>1</sub> and R<sub>2</sub>, taken together with the ring to which they are attached, form R<sub>7</sub>;
- 10 • R<sub>3</sub> and R<sub>4</sub> are different and are selected from the group consisting of H,  $\text{O}=\text{O}$ , OH, B(OH)<sub>2</sub>, M, or R<sub>3</sub> and R<sub>4</sub>, taken together with the ring to which they are attached, form R<sub>8</sub>;
- R<sub>5</sub> and R<sub>6</sub> are different and are selected from the group consisting of H or



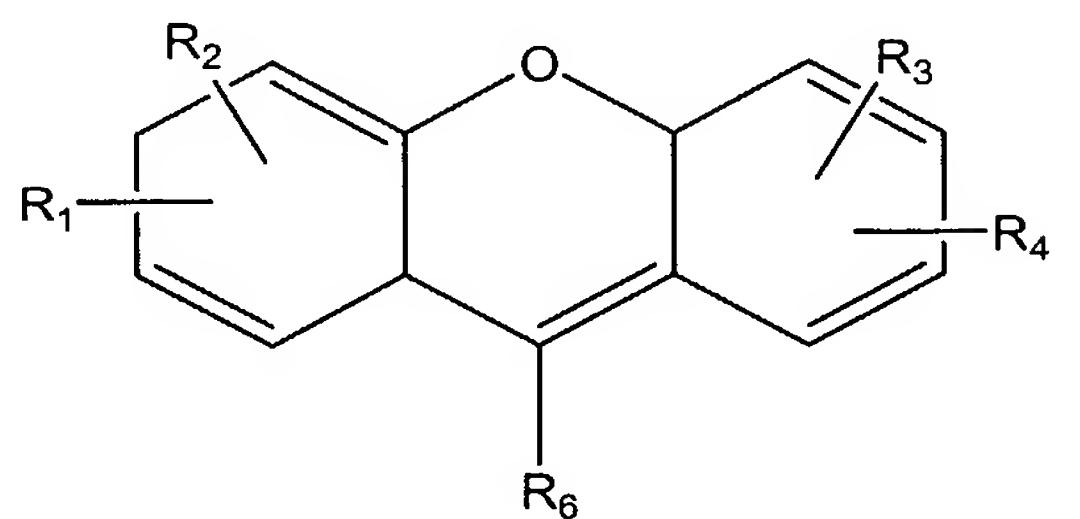
, wherein Q is H, COOH, B(OH)<sub>2</sub>, or M;

- 15 • A is OH, NH<sub>3</sub>,  $\text{O}=\text{O}$  or  $\text{N}^+(\text{CH}_3)_2$ ;
- R<sub>7</sub> is



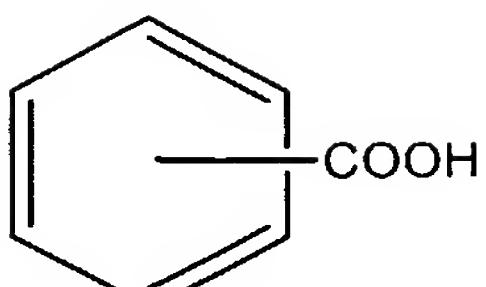
- L, when present, is an amino-containing linking moiety;
  - R<sub>1</sub> and R<sub>2</sub>, and R<sub>3</sub> and R<sub>4</sub>, are adjacent to each other on the rings on which they reside; and
  - at least one boronic acid moiety is present; and salts thereof.
- 5

2. The reporter compound of claim 1, wherein D is N or O.
3. A small molecule metabolite reporter compound of the following formula:

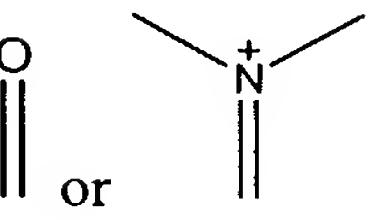


10 wherein

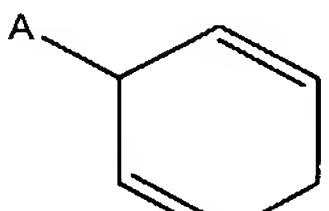
- R<sub>1</sub> and R<sub>2</sub> are different and may be A, or, R<sub>1</sub> and R<sub>2</sub>, taken together with the ring to which they are attached, form R<sub>7</sub>;
  - R<sub>3</sub> and R<sub>4</sub> are different and are selected from the group consisting of H,  $\text{O}=\text{O}$ , OH, B(OH)<sub>2</sub>, M, or R<sub>3</sub> and R<sub>4</sub>, taken together with the ring to which they are attached, form R<sub>8</sub>;
- 15



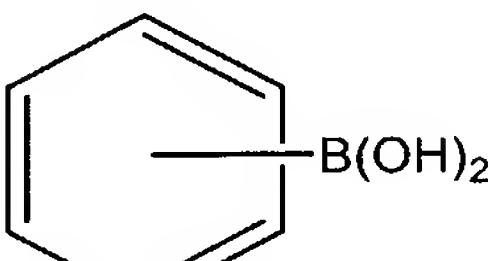
- R<sub>6</sub> is ;



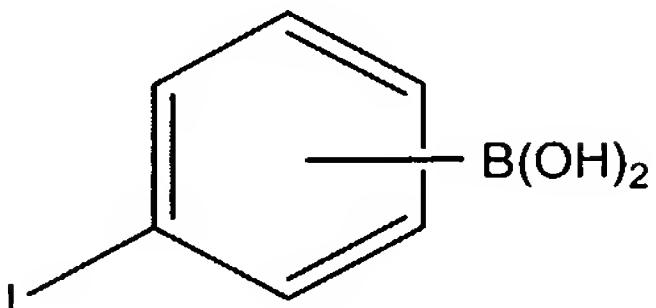
- A is or ;



- R<sub>7</sub> is ;



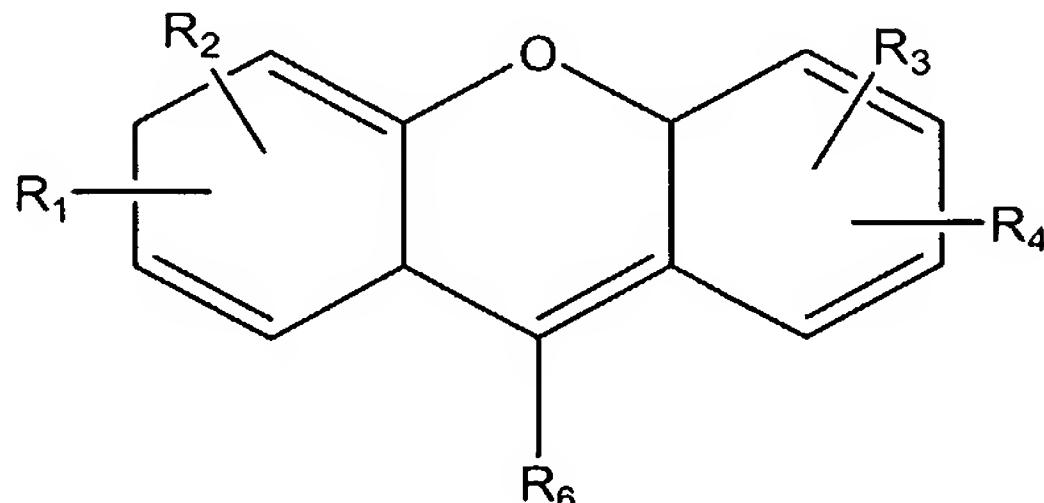
- R<sub>8</sub> is ;



5

- M is ;
- L, when present, is an amino-containing linking moiety; and
- R<sub>1</sub> and R<sub>2</sub>, and R<sub>3</sub> and R<sub>4</sub>, are adjacent to each other on the rings on which they reside; and salts thereof.

4. A small molecule metabolite reporter compound of the following formula:



10

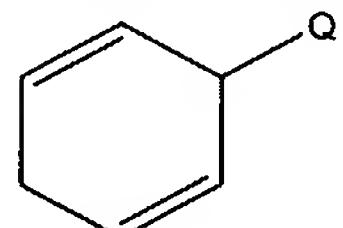
wherein

(III)

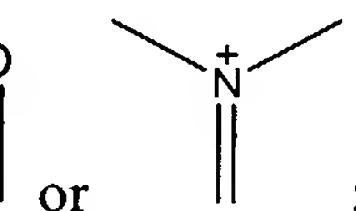
- R<sub>1</sub> and R<sub>2</sub> are different and are selected from the group consisting of H, OH, NH<sub>2</sub>, NO<sub>2</sub>, OCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub>, A, or, R<sub>1</sub> and R<sub>2</sub>, taken together with the ring to which they are attached, form R<sub>7</sub>;

5

- R<sub>3</sub> and R<sub>4</sub> are different and are selected from the group consisting of H, OH, M, or R<sub>3</sub> and R<sub>4</sub>, taken together with the ring to which they are attached, form R<sub>8</sub>;
- R<sub>5</sub> and R<sub>6</sub> are different and are selected from the group consisting of H or

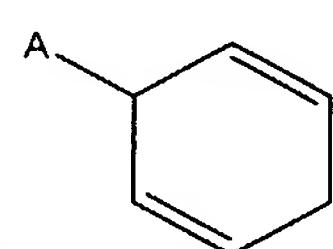


, wherein Q is H or M;



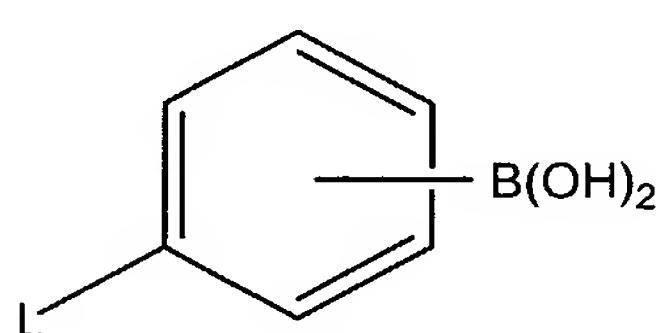
10

- A is OH, NH<sub>3</sub>, or ;



- R<sub>7</sub> is ;

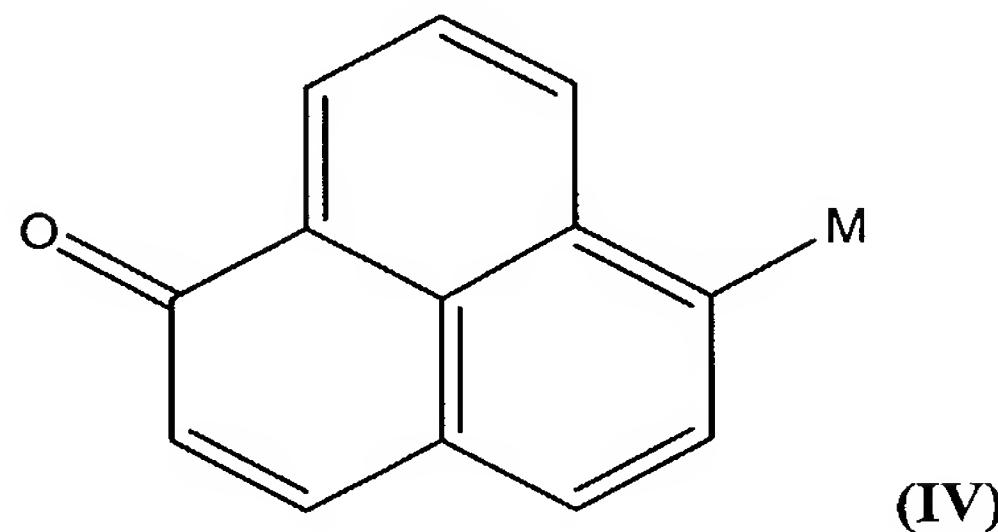
- R<sub>8</sub> is ;



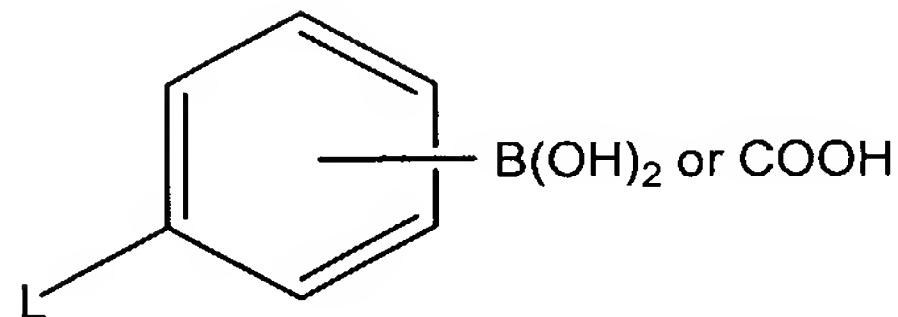
- M is ;
- L, when present, is an amino-containing linking moiety; and
- R<sub>1</sub> and R<sub>2</sub>, and R<sub>3</sub> and R<sub>4</sub>, are adjacent to each other on the rings on which they reside; and salts thereof.

15

5. A small molecule metabolite reporter compound of the following formula:

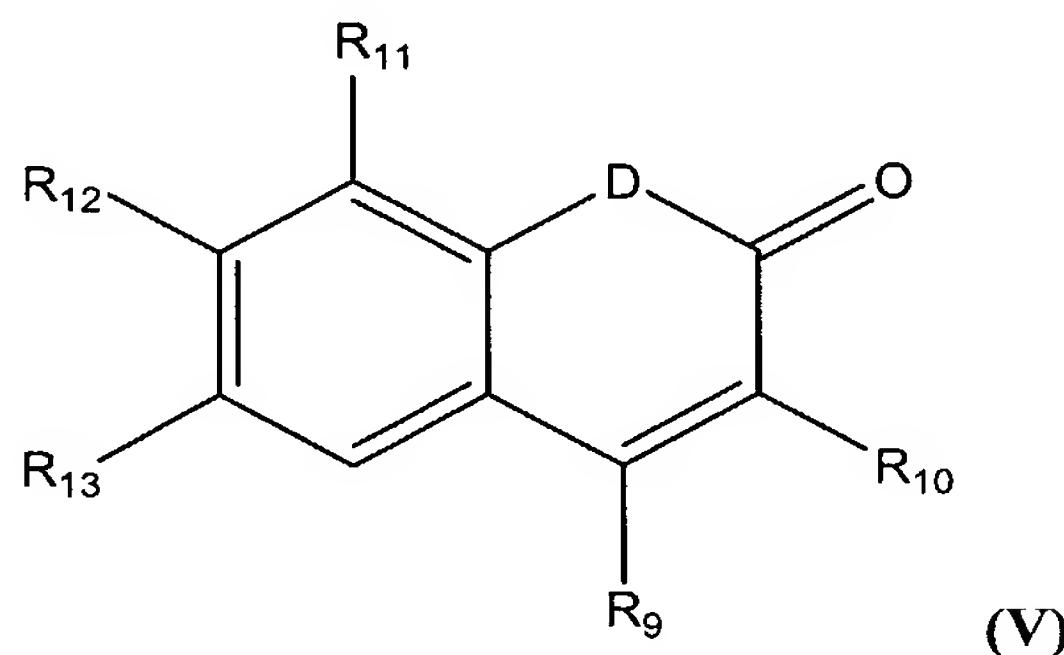


wherein



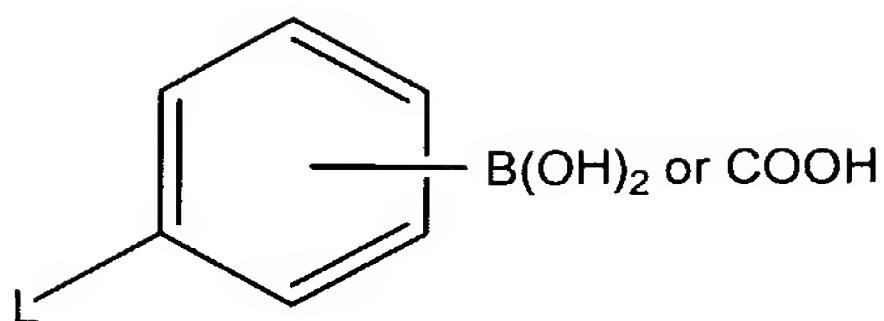
- M is ; and
- 5 • L, when present, is an amino-containing linking moiety; and salts thereof.

6. A small molecule metabolite reporter compound of the following formula:



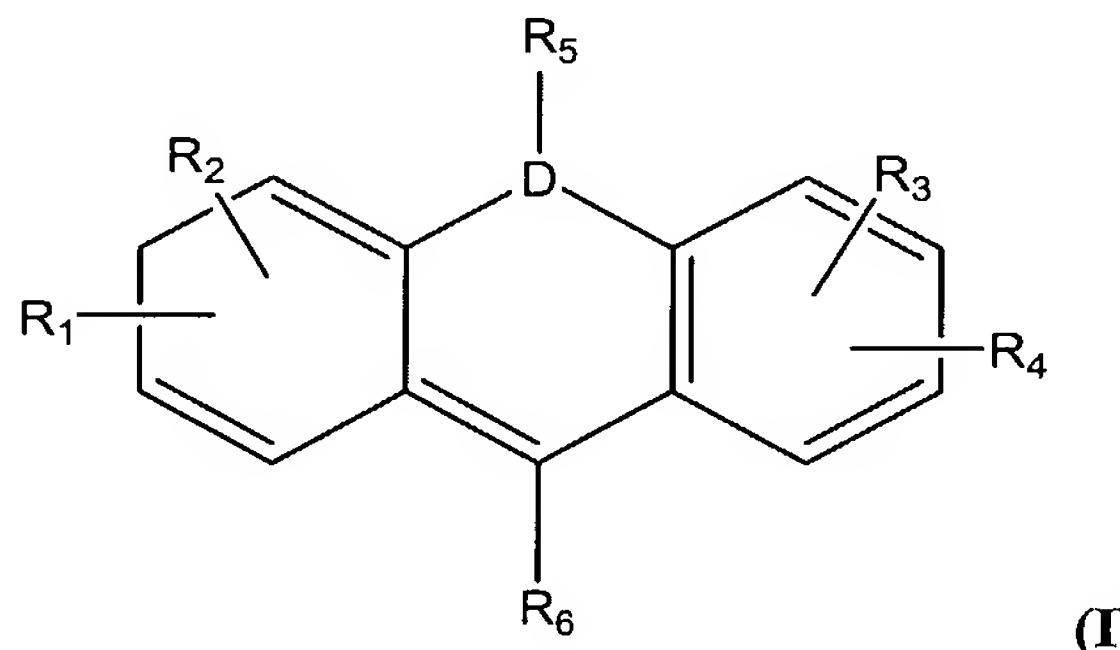
wherein

- D is a heteroatom (*e.g.*, O or N);
- 10 • R<sub>9</sub> is H, OH, CH<sub>3</sub>, CF<sub>3</sub>, M, or an amino or substituted amino group;
- R<sub>10</sub> is H, CH<sub>3</sub>, or M;
- R<sub>11</sub>, R<sub>12</sub>, and R<sub>13</sub> are individually H, OH, alkoxy, M, or an amino or substituted amino group;
- R<sub>14</sub>, when present, is H or CH<sub>3</sub>;



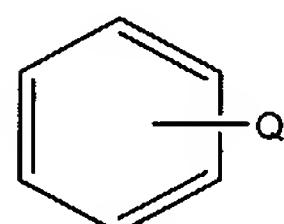
- M is ; and
- at least one boronic acid moiety is present; and salts thereof.

7. A topical sensor composition comprising a compound of any one of claims 1 through 6, and a carrier or binder:
- 5 8. A method of measuring a compound or metabolite thereof, comprising contacting a reporter compound of the following formula:

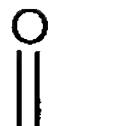
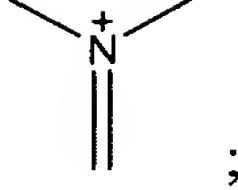


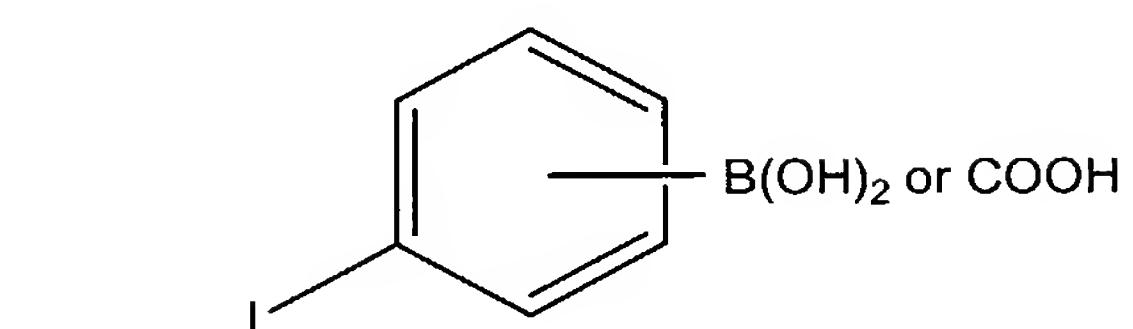
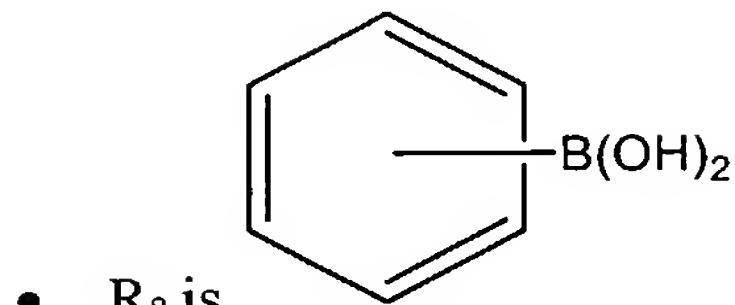
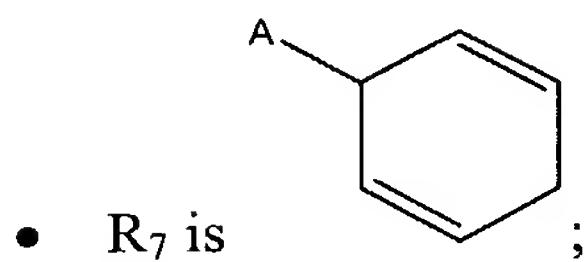
wherein

- D is a heteroatom;
- 10 • R<sub>1</sub> and R<sub>2</sub> are different and are selected from the group consisting of H, OH, NH<sub>2</sub>, NO<sub>2</sub>, OCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub>, A, or, R<sub>1</sub> and R<sub>2</sub>, taken together with the ring to which they are attached, form R<sub>7</sub>;
- 15 • R<sub>3</sub> and R<sub>4</sub> are different and are selected from the group consisting of H,  $\text{O}=\text{O}$ , OH, B(OH)<sub>2</sub>, M, or R<sub>3</sub> and R<sub>4</sub>, taken together with the ring to which they are attached, form R<sub>8</sub>;
- R<sub>5</sub> and R<sub>6</sub> are different and are selected from the group consisting of H or



, wherein Q is H, COOH, B(OH)<sub>2</sub>, or M;

- A is OH, NH<sub>3</sub>,  or ;

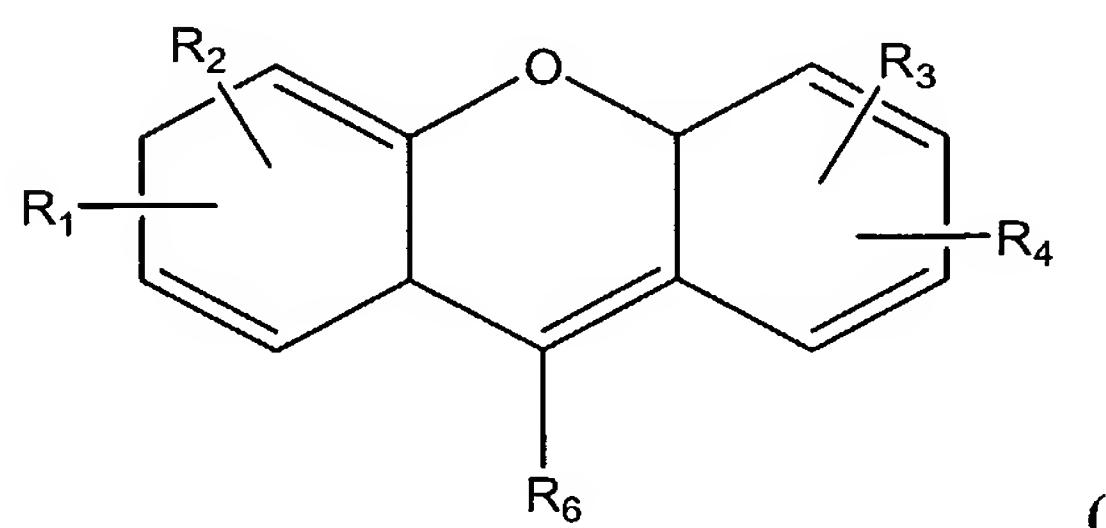


5

- L, when present, is an amino-containing linking moiety;
- R<sub>1</sub> and R<sub>2</sub>, and R<sub>3</sub> and R<sub>4</sub>, are adjacent to each other on the rings on which they reside; and
- at least one boronic acid moiety is present; and salts thereof; which reporter compound is sensitive to the presence of said compound or metabolite thereof, with an area of the body where said metabolites may be found, and detecting a photometric change in said reporter compound indicative of said metabolite.

10

9. A method of measuring a compound or metabolite thereof, comprising contacting a reporter compound of the following formula:



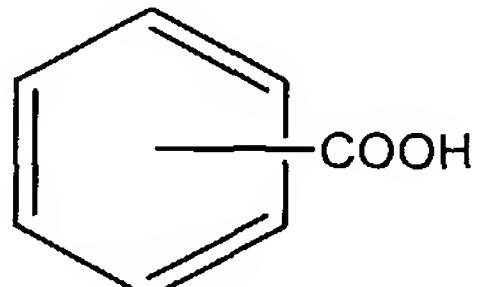
15

wherein

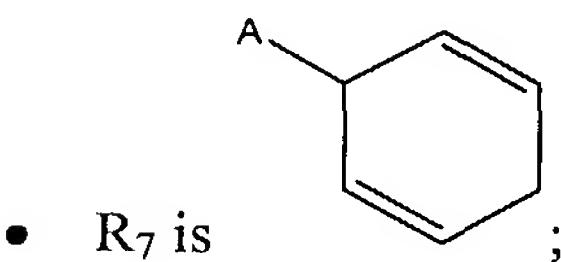
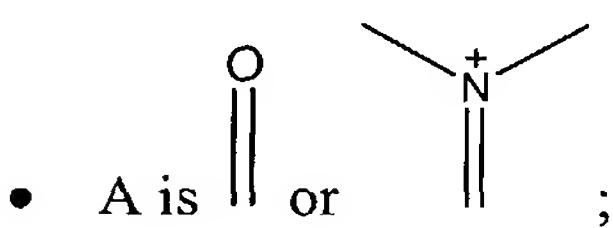
- R<sub>1</sub> and R<sub>2</sub> are different and may be A, or, R<sub>1</sub> and R<sub>2</sub>, taken together with the ring to which they are attached, form R<sub>7</sub>;

5

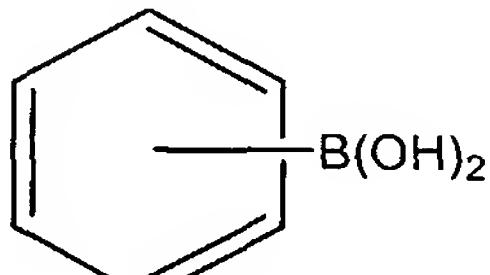
- R<sub>3</sub> and R<sub>4</sub> are different and are selected from the group consisting of H, , OH, B(OH)<sub>2</sub>, M, or R<sub>3</sub> and R<sub>4</sub>, taken together with the ring to which they are attached, form R<sub>8</sub>;



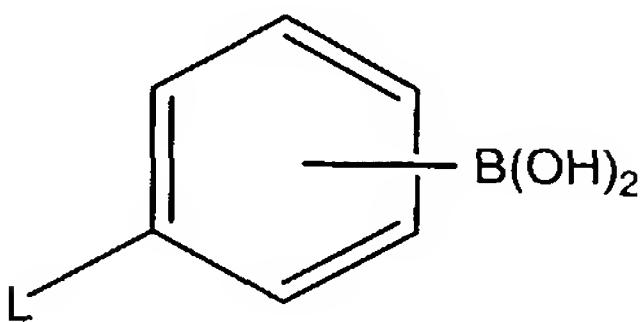
- R<sub>6</sub> is ;



- R<sub>7</sub> is ;



- R<sub>8</sub> is ;



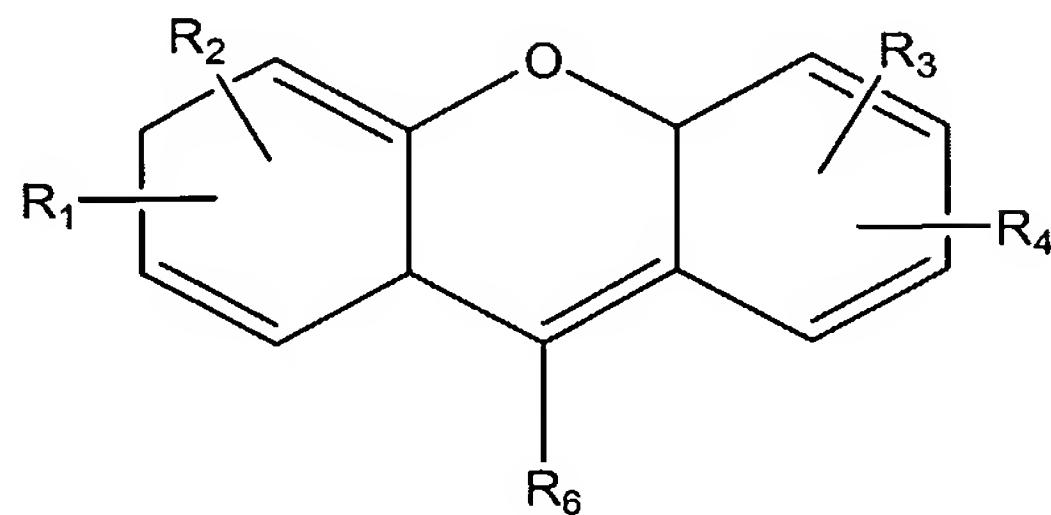
10

- M is ;

15

- L, when present, is an amino-containing linking moiety; and
- R<sub>1</sub> and R<sub>2</sub>, and R<sub>3</sub> and R<sub>4</sub>, are adjacent to each other on the rings on which they reside; and salts thereof; which reporter compound is sensitive to the presence of said compound or metabolite thereof, with an area of the body where said metabolites may be found, and detecting a photometric change in said reporter compound indicative of said metabolite.

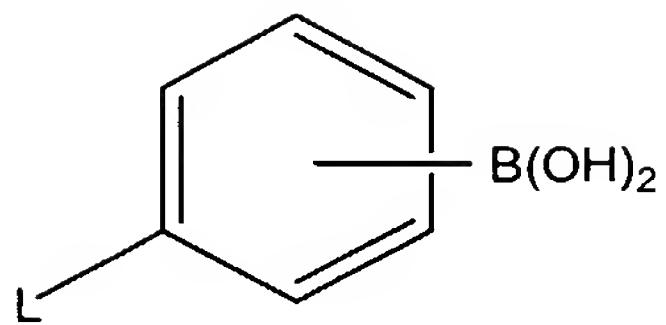
10. A method of measuring a compound or metabolite thereof, comprising contacting a reporter compound of the following formula:



wherein

- 5     • R<sub>1</sub> and R<sub>2</sub> are different and are selected from the group consisting of H, OH, NH<sub>2</sub>, NO<sub>2</sub>, OCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub>, A, or, R<sub>1</sub> and R<sub>2</sub>, taken together with the ring to which they are attached, form R<sub>7</sub>;
- 10    • R<sub>3</sub> and R<sub>4</sub> are different and are selected from the group consisting of H, , OH, M, or R<sub>3</sub> and R<sub>4</sub>, taken together with the ring to which they are attached, form R<sub>8</sub>;
- R<sub>5</sub> and R<sub>6</sub> are different and are selected from the group consisting of H or , wherein Q is H or M;
- A is OH, NH<sub>3</sub>, or ;
- R<sub>7</sub> is ,
- R<sub>8</sub> is ;

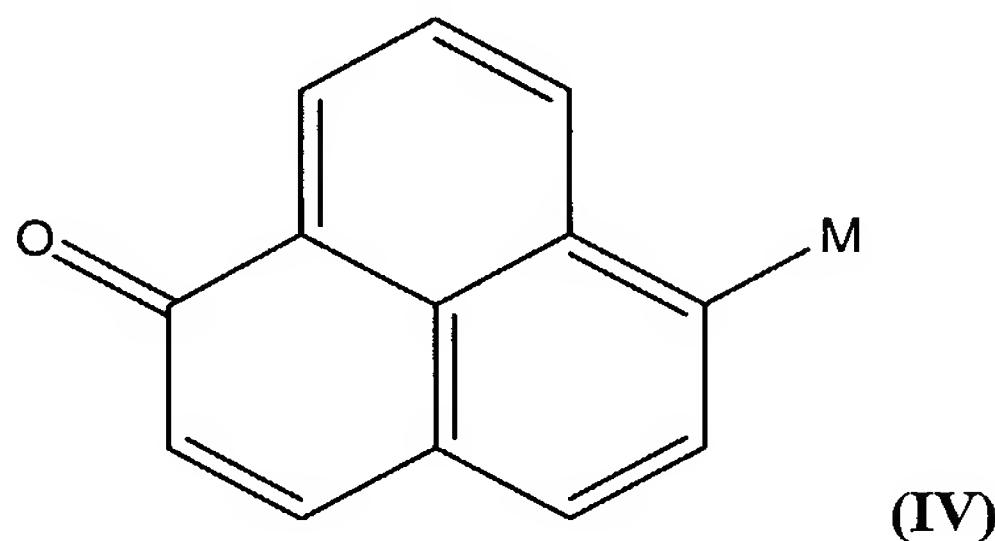
15



- M is ;
- L, when present, is an amino-containing linking moiety; and
- R<sub>1</sub> and R<sub>2</sub>, and R<sub>3</sub> and R<sub>4</sub>, are adjacent to each other on the rings on which they reside; and salts thereof; which reporter compound is sensitive to the presence of said compound or metabolite thereof, with an area of the body where said metabolites may be found, and detecting a photometric change in said reporter compound indicative of said metabolite.

5

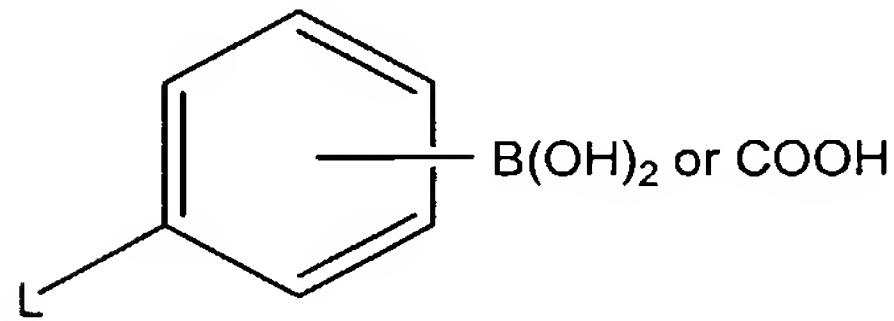
11. A method of measuring a compound or metabolite thereof, comprising contacting a reporter compound of the following formula:



10

(IV)

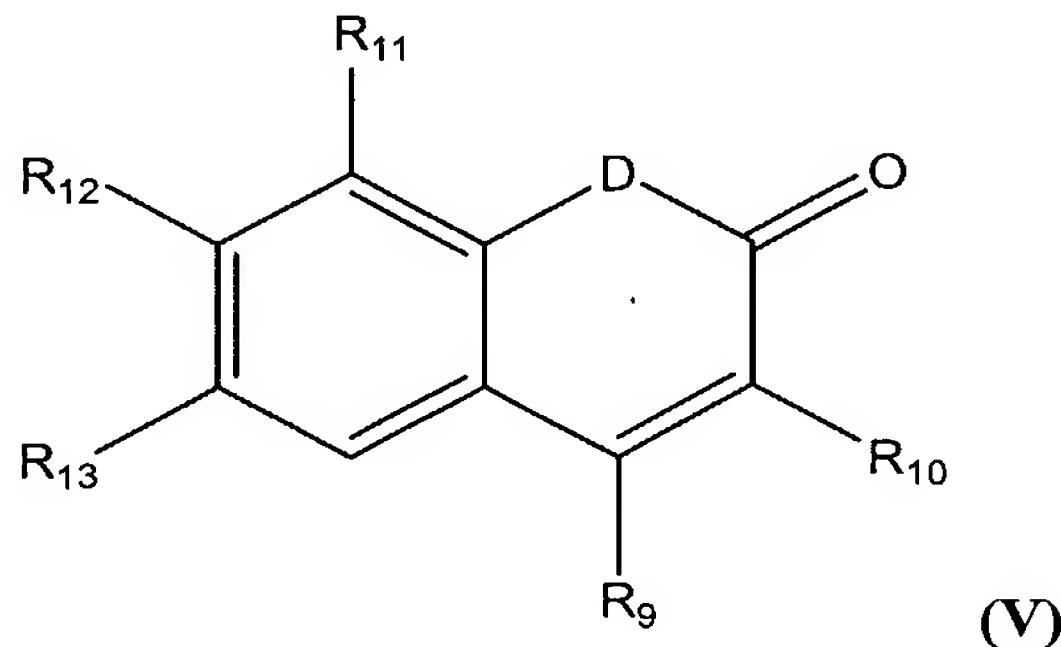
wherein



15

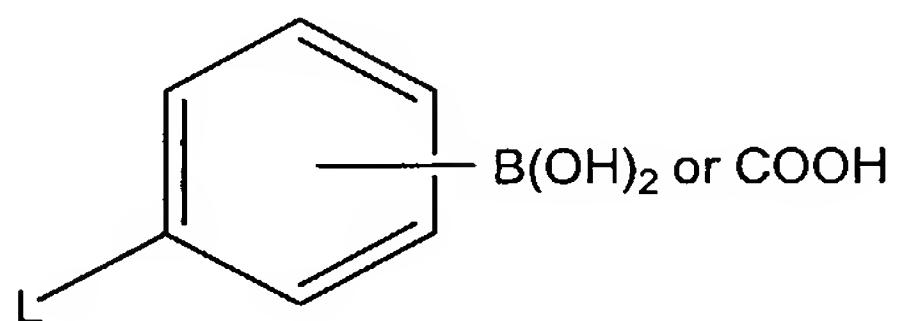
- M is ; and
- L, when present, is an amino-containing linking moiety; and salts thereof; which reporter compound is sensitive to the presence of said compound or metabolite thereof, with an area of the body where said metabolites may be found, and detecting a photometric change in said reporter compound indicative of said metabolite.

12. A method of measuring a compound or metabolite thereof, comprising contacting a reporter compound of the following formula:



wherein

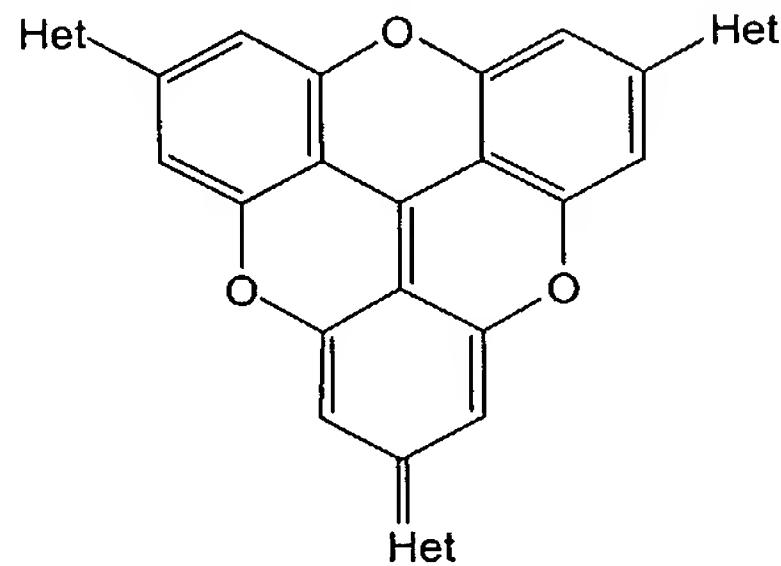
- 5     • D is a heteroatom (e.g., O or N);
- R<sub>9</sub> is H, OH, CH<sub>3</sub>, CF<sub>3</sub>, M, or an amino or substituted amino group;
- R<sub>10</sub> is H, CH<sub>3</sub>, or M;
- R<sub>11</sub>, R<sub>12</sub>, and R<sub>13</sub> are individually H, OH, alkoxy, M, or an amino or substituted amino group;
- R<sub>14</sub>, when present, is H or CH<sub>3</sub>;



- M is ; and
- at least one boronic acid moiety is present; and salts thereof, which reporter compound is sensitive to the presence of said compound or metabolite thereof, with an area of the body where said metabolites may be found, and detecting a photometric change in said reporter compound indicative of said metabolite.

13. The method of any one of claims 8 through 12, wherein said area of the body is skin.
14. The method of any one of claims 8 through 12, wherein said area of the body is the layer of the skin known as *stratum corneum*.

15. The method of any one of claims 8 through 12, wherein said area of the body is the layer of the skin known as *epidermis*.
16. The method of any one of claims 8 through 12, wherein said area of the body is the layer of the skin known as *dermis*.
- 5 17. The method of any one of claims 8 through 12, wherein said compound is glucose.
18. A chromophore of the following formula:



wherein Het represents a heteroatomic group, which groups may be identical or different.

- 10 19. The chromophore of claim 18, wherein heteroatomic group comprises N, O, or S.